Employee Spotlight: Alessandro Cattaneo

April 12, 2015

One thing leads to another

The first time the Laboratory's post-doctoral mechanical engineer Alessandro Cattaneo arrived in the United States from his native Italy, he was a regular tourist taking a road trip through the American West with three Italian friends in August 2007. The four returned the following summer with four more friends from Italy to see a larger chunk of the country, but this time renting two cars instead of just one and traveling from coast to coast.

Olympic National Park, Washington (Cattaneo in red t-shirt)

"For the 2008 trip my seven friends and I flew from my home town of Milan, Italy, to Seattle, Washington," Cattaneo recalls, "and visited all the major tourist spots between Seattle and New York City, including Yellowstone and Grand Teton National Parks, Mount Rushmore and Niagara Falls. We had a blast and, just as in 2007,

were impressed by the friendliness of the people and the expansiveness of the vast landscapes. There was no way to compare the huge distances we covered to what we were used to from our tiny Italy, which is slightly smaller than New Mexico and slightly larger than Arizona."

Downtown Chicago

When Cattaneo arrived in the United States for the third time in August 2011, he was a PhD student at the Politecnico di Milano on leave for a six-month stint in Los Alamos National Laboratory's Engineering Institute.

"I had been involved in structural health monitoring research in Milan," Cattaneo explains, "which tries to detect damage in structures or mechanical systems as a result of inevitable aging and degradation or because of extreme events like an earthquake. Los Alamos' Engineering Institute is considered one of the structural health monitoring leaders in the world, and I was lucky that my PhD advisor in Milan was able to successfully secure the Engineering Institute position for me so that I could gain international experience."

Once here, Cattaneo not only enjoyed participating in the Laboratory's cutting-edge structural health monitoring projects but liked the friendly, informal and multi-disciplinary work environment, and he felt at home in Los Alamos' international atmosphere.

Cattaneo left Los Alamos on a sunny morning at the beginning of March 2012. As he headed out of town, he looked in the car's rearview mirror for a last glimpse and caught sight of the "Los Alamos – Where Discoveries Are Made!" welcome sign, which seemed fitting and inspiring. Descending the hill and making his way toward Albuquerque for the long flight home, Cattaneo increasingly wondered how he might be able to return.

Visit number 4

With his PhD in hand from Milan, Cattaneo did manage to come back to New Mexico in December 2013 after being accepted into his current postdoc position. This fourth arrival into the U.S. was different, though, because for the first time it was Cattaneo who actively tried to make the visit a reality.

"For both of the road trips, and also for the Engineering Institute in 2011, I had been invited by someone else," Cattaneo says. "For my postdoc appointment, I made the effort. I initiated the application and did my best to get in, because this was about more than a short vacation or a temporary experience abroad. This was about making a wholesale change in my life and investing in my future career."

One of the major structural health monitoring projects that Cattaneo has participated in so far at Los Alamos has been the creation of a remotely readable tamper evident seal, a device that recognizes unauthorized access to protected areas or items. The seal has potential for international nuclear nonproliferation applications and commercial use.

A crucial breakthrough came during lunch. "My Los Alamos mentor, David Mascareñas, and I came up with a new approach to the seal while we were eating and chatting at Los Alamos' Hot Rocks Café," Cattaneo says. "The innovation began as a simple idea sketched on a paper napkin but triggered months of hard work."

In addition to leading to an important invention, the seal project became an interesting research topic for participants of the Laboratory's nine#week Dynamics Summer School during the summer of 2014 and provided Cattaneo with a valuable mentoring opportunity.

"Mentoring the students was a particularly enriching experience for me," Cattaneo notes. "The students did an excellent job understanding what David and I had accomplished up to that point, and they showed a lot of creativity in helping us move the project forward. The last prototype we made that summer reflected the solutions the students had proposed and implemented. When I compare that version with the first primitive seal I had made, I'm amazed that my initial attempt had worked at all."

Cattaneo also is amazed by how far he has come personally and professionally since his first American road trip. "When I landed in Los Angeles in 2007, I was just a young kid wanting to have fun," Cattaneo says, "but the initial adventure has turned into so much more."

Cattaneo works for the Applied Engineering and Technology Division's Mechanical and Thermal Engineering group and the Laboratory's National Security Education Center.

Resources

- Los Alamos Dynamics Summer School
- Los Alamos Engineering Institute
- Politecnico di Milano (English-language page)

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